

the 11th and 12th, interrupting traffic. At Nashville, Tenn, rain alternated with sleet.

**12th.**—Heavy rain, with sleet, prevailed in Tennessee and in parts of the middle and east Gulf states on the 12th and 13th, and this condition extended over the Ohio Valley, the lower lake region, and the middle Atlantic coast during the 14th.

**15th.**—A heavy snowstorm prevailed in the Atlantic coast states from North Carolina to Maine.

**17th.**—A heavy snowstorm set in over the middle Mississippi and lower Missouri valleys, and extended over the Ohio Valley and the middle and west Gulf states during the 18th and 19th.

**21st.**—Snow, and a southeast gale reaching 55 miles per hour, prevailed at Buffalo, N. Y.

**25th.**—High southerly winds prevailed along the Pacific coast. At Eureka, Cal., the barometer fell one-third inch in the 12 hours preceding 8 a. m. The wind increased to a gale from the south at 8.30 a. m., and continued high until noon, causing slight damage to property; rain fell in the afternoon. Some damage was caused to buildings in San Francisco, Cal., by high wind.

**26th.**—A severe northwest gale prevailed from Virginia to the south New England coast, and continued during the 27th. At Cape Henry, Va., the wind reached a velocity of 50

miles per hour at 10.50 a. m., and continued high during the 27th. A three-masted schooner was driven ashore, but was floated off by a wrecking vessel after the gale subsided. At Yuma, Ariz., a rainstorm set in and continued, at intervals, until the 30th.

**27th.**—Several marine disasters were reported near New York City during a northwest gale. Drifting snow caused a blockade of street car lines at Buffalo, N. Y.

**28th.**—Rain began at Port Angeles, Wash., in the afternoon and continued during the 29th, causing streams in Clallam county to overflow their banks.

**29th.**—The British ship "Ferndale," with 20 of her crew, was reported lost on the Washington coast 9 miles north of the entrance to Grays Harbor.

**30th.**—A heavy northeast gale prevailed on the southeast New England coast during the 29th and 30th. At Eureka, Cal., high wind and rain prevailed in the early morning. The schooner "Mable Gray" was wrecked north of Cape Mendocino; no lives were lost. A thunderstorm from the southeast began at Tucson, Ariz., 2.02 p. m., and lasted 25 minutes. At 6 p. m. a high wind sprung up from the west and continued one hour, reaching a velocity of 39 miles per hour at 6.10 p. m. The barometer rose .10 inch in 30 minutes. During a thunder and sleet storm at Estalina Springs, N. Mex., some cattle on exposed places on the range were killed.

## INLAND NAVIGATION.

### ICE IN RIVERS AND HARBORS.

The Hudson River was full of floating ice at Albany, N. Y., on the 9th; near Troy, N. Y., the river was closed by ice. On the 15th the river was clear of ice at Albany, N. Y., and the water was very high.

The Raritan River was closed by ice at New Brunswick, N. J., on the 26th.

Floating ice was reported in the Susquehanna River at Wilkes Barre, Pa., on the 10th, 11th, and 18th; on the 15th the river was clear of ice, and on the 19th it was closed by ice. At Lock Haven, Pa., the Susquehanna River was partly frozen on the 7th, 8th, and 22d to 24th; frozen on the 9th to 12th and 26th to 31st; ice partly gone on the 13th; ice moving out on the 14th and 16th to 18th; and slush ice on the 20th and 21st. On the 28th the Susquehanna was frozen over at Havre de Grace, Md.

The Clarion River was frozen at Clarion, Pa., on the 10th; river clear of ice on the 14th.

Ice was running in the Youghiogheny River at West Newton, Pa., on the 4th, 8th, 9th, and 27th.

Floating ice was reported in the Allegheny River at Freeport, Pa., on the 6th, and from the 9th to 12th the river was frozen.

The Monongahela River was frozen at Greensborough, Pa., on the 10th; river clear of ice on the 13th; navigation closed on the 27th. At Lock No. 4, Pa., ice was floating in the Monongahela River on the 8th, 9th, 11th, 12th, 20th to 22d, 26th, 30th, and 31st; river frozen on the 10th and 27th to 29th; ice running out on the 13th, and the river was clear of ice on the 14th.

Ice broke up in the Little Kanawha River at Glenville, Pa., on the 12th.

**Ohio River.**—At Pittsburg, Pa., navigation was suspended to points on the Ohio River on the 13th on account of heavy ice; 14th, floating ice in Allegheny River; 21st to 25th, floating ice in both rivers; 26th, floating ice in both rivers, and navigation to points above closed on account of ice and low water; 27th, floating ice in both rivers; 31st, navigation resumed on the Monongahela River, and the river free from ice. At Parkersburg, W. Va., heavy ice was reported from the 6th to 9th; ice 6 inches in thickness was running on the 10th; 20th to 28th, heavy ice; 29th, but few boats running on account of

heavy ice; ice in river 30th and 31st. At Louisville, Ky., river filled with floating ice on the 12th; navigation partially suspended on the 13th, 14th, and 15th on account of ice; river clear and navigation fully resumed on the 17th. The river was full of floating ice at Vevay, Ind., on the 11th. At Shawneetown, Ill., floating ice was reported from the 8th to 11th; navigation closed on the 12th, and opened on 20th.

**Detroit River.**—At Detroit, Mich., heavy ice was reported on the 3d; floating ice on the 5th, 6th, 8th, and 9th; 11th, ice backing up from below the city; 13th, large quantities of floating ice; 15th, river frozen over for the first time in several years; a heavy ice bridge formed below the city, delaying the transfer of trains of the Michigan Central, Grand Trunk, and Canadian Pacific Railroads; 18th, ice bridge increasing in size; 20th, river continued frozen and ice jam unbroken; 26th and 27th, heavy running ice; 30th, large quantities of floating ice.

**Saint Clair and Black Rivers.**—At Port Huron, Mich., the Black River was frozen and the Saint Clair River full of floating ice on the 4th; 7th, floating ice in the Saint Clair River; 8th, Saint Clair River full of floating ice, rendering navigation to Detroit difficult; Lake Huron frozen as far as could be seen; 9th to 11th, floating ice in Saint Clair River; 12th, Saint Clair River full of floating ice, and frozen over from Fort Gratiot to Point Edward; river also reported blocked at Saint Clair, 12 miles below Port Huron; 13th, ice in Sarnia Bay 8 inches in thickness; 26th, Saint Clair River blocked with ice between Port Huron and Sarnia, and ferryboats discontinued their trips; 27th, Saint Clair River frozen over, and for the first time in a number of years persons were crossing on the ice.

At Lansing, Mich., the Grand River was frozen on the 3d, and on the 20th the ice was 9 inches in thickness.

At Sault de Ste. Marie, Mich., the Saint Marys River was frozen over for the first time this season on the 3d, and ferryboats were compelled to discontinue their trips.

**Mississippi River.**—At Red Wing, Minn., loaded teams were crossing on the ice on the 4th; on the 18th the ice was 24 inches in thickness. At Dubuque, Iowa, the river was frozen over on the 9th; on the 13th the ice was 15 inches, and on the 20th it was 20 inches in thickness. At Davenport Iowa, the river was frozen over on the 7th; 11th, persons crossing on the

ice; 13th, teams crossing on the ice. At Le Claire, Iowa, the river was frozen from the 3d to 31st. At Keokuk, Iowa, the river was frozen on the 9th. At Muscatine, Iowa, the river was frozen on the 7th. At Saint Louis, Mo., the river was frozen on the 16th; ice gorge moved some on the 25th; 29th, ice broken up and river full of floating ice. Teams were reported crossing the river on the ice at Cape Girardeau, Mo., on the 15th, and the 19th an ice gorge formed at that place. At Cairo, Ill., heavy ice commenced running on the 7th, and all boats from Saint Louis bound south were tied up; 8th and 9th, ice running; 12th, river frozen over; 13th to 15th, heavy slush running in the Ohio River; 20th, navigation in the Ohio River difficult on account of floating ice; ice damaged the "Cotton Belt" incline at Birds Point; 22d, ice in the Ohio River ran out; 31st, ice gorge in the Mississippi River broke up and the ice ran out rapidly.

The Missouri River at Saint Pierre, S. Dak., was frozen throughout the month. At Sioux City, Iowa, teams crossed on the ice on the 16th. At Hermann, Mo., floating ice was reported on the 7th; heavy floating ice on the 9th; river gorged with ice on the 11th; ice gorge broken on the 29th.

At Fort Smith, Ark., the Arkansas River was covered for a short time with a thin sheet of ice on the 20th. At Little Rock, Ark., the river was frozen, except in the channel, on the 14th. On the 23d the river was open.

At Manhattan, Kans., the Big Blue River was frozen on the 8th and 12th.

At New Haven, Conn., the harbor was frozen on the 27th. At Erie, Pa., the bay was frozen on the 4th, and on the 7th the ice on the bay was 4 inches in thickness. The river was frozen at Cleveland, Ohio, on the 7th. At Grand Haven, Mich., the harbor was almost blocked by slush ice at the mouth of the river on the 8th; on the 9th steamers forced their way through the slush ice with great difficulty; on the 10th the slush ice was carried into the lake by easterly winds, and navigation was unobstructed; 28th, navigation again obstructed by an accumulation of slush ice. At Milwaukee, Wis., the lake was frozen  $\frac{1}{2}$  to  $\frac{3}{4}$  mile from shore on the 3d; reports of the 6th and 10th stated that the lake continued frozen.

#### FLOODS.

In the middle of the month freshets occurred in the streams of New Hampshire, eastern New York, eastern Pennsylvania, and eastern Virginia.

From the 15th to 20th rivers in South Carolina, Georgia, and Alabama rose rapidly. On the 20th the Congaree River was 24.05 feet, 9.05 feet above the danger-line, at Columbia, S. C. At Augusta, Ga., the Savannah River rose to 31 feet by the morning of the 20th, and at 10 p. m., that date, reached 32.8 feet, 0.8 foot above the danger-line, without causing material damage. At Montgomery, Ala., the Alabama River reached 54 feet, 6 feet above the danger-line, on the 16th; no material damage was caused, save to railroads, which were submerged above the city.

The Ohio, Cumberland, and Tennessee rivers rose rapidly the middle part of the month. The rivers rose rapidly at Pittsburg, Pa., and at 6 p. m., 13th, the false work of the Herra Island bridge was washed away. On the 15th the river reached

22.9 feet at Pittsburg, after which the water subsided. At Cincinnati, Ohio, the river reached 33.5 feet the morning of the 16th, a rise of 13.4 feet in 24 hours. During the next 24 hours it rose to 40.5 feet, and the morning of the 18th stood at 41.6 feet on the gauge, after which it began to fall.

At Chattanooga, Tenn., the Tennessee River was rising at the rate of 4 inches per hour on the 13th. The morning of the 14th the stage of water was 22.9 feet, a rise of 11.7 feet in 24 hours. Heavy drift was observed. The tracks of the Richmond and Danville, and Western and Atlantic Railroads were partially under water. At Charleston, Tenn., the river was 3.5 feet above the danger-line, and at Loudon, Clinton, and Rockwood it was approaching the danger-line. By the morning of the 15th there was a further rise of 10 feet at Chattanooga, and the river rose steadily at the rate of about 0.2 foot per hour. The water at 6 p. m. began to cover the tracks of the Richmond and Danville Railroad at Rossville Avenue; the dummy trains on the Union Belt Line to Look-out Mountain were stopped in the evening, and residents were forced to move from low-lying parts of the city. The morning of the 16th the stage of water was 37.1 feet, a rise of 4.2 feet in 24 hours, and the morning of the 19th it reached 37.9 feet, 4.9 feet above the danger-line, after which the water subsided slowly. The rise at Chattanooga from the 11th to the 17th was 29.8 feet.

*Heights of rivers above low-water mark, January, 1892 (in feet and tenths).*

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La. ....	29.9	25, 26	8.5	17	3.5	5.0
<i>Arkansas River.</i>						
Fort Smith, Ark. ....	22.0	4	3.9	21, 22, 23	1.8	2.1
Little Rock, Ark. ....	23.0	4	10.3	18	4.4	5.9
<i>Missouri River.</i>						
Fort Buford, N. Dak. †. . .						3.0
Sioux City, Iowa. ....	18.7					
Kansas City, Mo. ....	21.0	3†	7.7	10	1.5	6.2
<i>Mississippi River.</i>						
Saint Paul, Minn. †. ....	14.0					
La Crosse, Wis. †. ....	11.8					
Dubuque, Iowa. †. ....	16.0					
Davenport, Iowa. †. ....	15.0					
Keokuk, Iowa. †. ....	14.0					
Saint Louis, Mo. †. ....	30.0	28	10.4	11	2.9	7.5
Cairo, Ill. ....	40.0	24	30.3	15	14.7	15.6
Memphis, Tenn. ....	33.0	26, 27	22.0	18	10.4	11.6
Vicksburg, Miss. ....	41.0	3†	28.9	1	16.6	12.3
New Orleans, La. ....	13.0	3†	8.0	1	4.2	3.8
<i>Ohio River.</i>						
Parkersburg, W. Va. ....	38.0	17	27.0	3†	6.6	20.4
Cincinnati, Ohio. ....	45.0	18	41.6	14	14.0	27.6
Louisville, Ky. ....	24.0	19	16.5	15	7.7	8.8
<i>Cumberland River.</i>						
Nashville, Tenn. ....	40.0	20	30.2	3†	9.3	20.9
<i>Tennessee River.</i>						
Chattanooga, Tenn. ....	33.0	17	37.9	1, 2	6.6	31.3
Knoxville, Tenn. ....	29.0	15	23.3	1	2.1	21.2
<i>Monongahela River.</i>						
Pittsburg, Pa. ....	29.0	15	22.9	11	2.5	20.4
<i>Savannah River.</i>						
Augusta, Ga. ....	32.0	20	32.8	2	7.8	25.0
<i>Willamette River.</i>						
Portland, Oregon. ....	15.0	5	12.1	24, 25	2.3	9.8
<i>Susquehanna River.</i>						
Harrisburg, Pa. ....	17.0	16	13.2	29	2.1	11.1
<i>Alabama River.</i>						
Montgomery, Ala. ....	48.0	16	54.0	1	4.6	49.4

\* For 27 days.

† River frozen.

‡ For 20 days.

#### ATMOSPHERIC ELECTRICITY.

##### AURORAS.

The auroral displays of the month were numerous and brilliant. On the 5th auroras were reported in the northern tier of states from Maine to Washington, and in the western central valleys as far south as the north part of Oklahoma Territory. On the 29th they were observed from Montana to the middle Atlantic and New England states and southward in the central valleys to the 37th parallel, and on the 30th from the Dakotas to the New England coast. Auroras were also reported in northern New England on the 10th; in New York on the 3d,

4th, and 27th; in Michigan on the 27th and 28th; in Wisconsin on the 1st and 28th; in Minnesota on the 23d, 25th, and 28th; in Iowa on the 2d, 3d, 4th, 15th, and 28th; and in the Dakotas on the 12th, 25th, and 28th.

On the 5th the display was one of the most brilliant ever observed at Eastport, Me., and continued from 6.20 p. m. until midnight. It consisted of an arch of 30° to 35° altitude, with great beams of light shooting upward, some of which passed the zenith and almost reached the southern horizon. At Portland, Me., the aurora was observed from 9.15 to 11.45 p. m.